

REMARKS

This Amendment is being filed in response to the Office Action mailed on April 28, 2004, extended three months by Petition filed herewith. Claims 31-96 are currently pending in this application and stand rejected. Applicants respectfully request reconsideration and allowance of the pending claims in the present application in view of the amendments and remarks below.

I. Amendments to Claims

In this response to the Office Action, Applicant has amended claims 31-35, 37, 39, 41-50, 52, 53, 55-57, 59-63, 65-72, 74, 76-85, and 87-96. Claims 40, 64, and 75 are cancelled, and Claims 97-104 are new. The amendments and the new claims are supported in the specification as submitted and no new matter has been introduced.

II. *Young*, in view of *Rothberg*, does not render the claims obvious

The Examiner has rejected Claims 31-52, 59-70, and 93-96 under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,416,848 (*Young*), in view of US Patent No. 6,141,657 (*Rothberg*). Applicant respectfully traverses this rejection. The Examiner states that *Young* teaches using mathematical analysis and manipulation of ordered information in multidimensional space to points on the complex plane in the Julia sets and controlling the geometry of the model with the iterative function or algorithm (col. 8, lines 55-67; col. 9, lines 8-18; col. 4, lines 4-60; col. 1, lines 8-12; Abstract; col. 5, lines 15-32). The Examiner also states that *Young* teaches matching the points in the multidimensional space with the systematic method of having the capabilities for controlling the geometry of models (col. 4, lines 61-67; col. 5, lines 1-32). Finally, the Examiner states that *Young* teaches using mathematically iterated functions on the points in the multidimensional space (col. 5, lines 15-32). The Examiner states, however, that *Young* does not teach the dataset of the present invention.

The Examiner states that *Rothberg* teaches a sample sequence the target sequence such as DNA sequence comprising a plurality of nucleic acids of database sequence is generated by recognition means (col. 16, lines 52-67; col. 17, lines 1-20; col. 63, lines 24-32).

As amended, Claim 31 requires: (a) providing a multidimensional map comprising points which can serve as domains for an iterative algorithm to generate datasets of data, and each point

in the map can be represented by coordinates of the map; (b) mathematically generating from a point in the multidimensional map a comparison string comprising a dataset of data, wherein the point can serve as the domain for the iterative algorithm to generate a dataset of data; (c) scoring the comparison string to determine if the comparison string meets a pre-determined condition or property related to the target string; (d) marking the point in the multidimensional map if the score of the comparison string meets the pre-determined condition or property, wherein the marked point serves as a model for the target string; (e) repeating the steps (a)-(d) for a plurality of comparison strings, to generate multiple marked points on the multidimensional map; and (f) extracting visually or mathematically any patterns formed within each marked point or between marked points.

There is no disclosure or motivation within the references to combine the teachings of *Young* and *Rothberg*. The Examiner cites *Rothberg* (col. 16, lines 4-14), but, again, there is no motivation to combine *Young*, which teaches the ordering of colors. Nowhere in lines 4-14 is there the suggestion that a method of ordering colors and a method of identifying DNA sequences without sequencing can be combined. *Rothberg* precisely teaches nucleotide sequences (*Rothberg*: col. 16, line 9) and subsequences (*Rothberg*: col. 16, lines 5, 6, and 11). The Examiner suggests that “a new pattern that optimizes the information measure” supplies motivation (*Rothberg*: col. 16, line 14). Applicant respectfully disagrees. The pattern in the cited line denotes an arrangement of a nucleotide sequence to better recognize another nucleotide sequence through a biological assay, in no way alluding to a complex plane or ordered fractal geometry.

Moreover, even if there were a motivation, the combination would not render the present technology. *Rothberg* does not teach the comparison string as the Examiner suggests (“*Rothberg* teaches a dataset”). Neither of *Rothberg*’s “datasets” are mathematically generated. Additionally, neither reference teaches that the point alone, chosen from a multidimensional map, is sufficient to represent the comparison string, which itself is a model of the target string. Therefore, the point is a model of the target string. Moreover, neither reference discloses extracting patterns from the points alone. Thus, the combination of the two references—even if there were a motivation to combine—does not forestall the patentability of the present invention. Accordingly, Applicant respectfully submits that the amended Claim 31 is in condition of allowance and respectfully requests early notice of the same.

Claims 32-39 and 41-63 are dependent claims based on amended independent Claim 31. Since amended Claim 31 is allowable, as previously detailed, narrower Claims 32-39 and 41-63 are, consequently, also allowable. Likewise, new Claims 97-100 are dependent upon amended Claim 31, and are, therefore, allowable.

Claims 40 and 64 are cancelled.

Amended Claim 65 is similar to amended claim 31 and requires: (a) providing a multidimensional map comprising points which can serve as domains for an iterative algorithm to generate datasets of data, and each point can be represented by coordinates on the map; (b) mathematically generating from a point in the multidimensional map a comparison string comprising a dataset of data, wherein the point can serve as the domain for the iterative algorithm to generate a dataset of data; (c) scoring the comparison string by evaluating a function having the comparison string and one of the target strings as inputs, wherein the evaluation may be repeated for a number of the other target strings, to determine for each target string if a mark should be placed on the point in the multidimensional map corresponding to the comparison string; (d) marking the point in the multidimensional map if it is determined that the point should be marked, wherein the marked point serves as a model for the target string; (e) repeating the steps (a)-(d) for a plurality of comparison strings, to generate multiple marked points on the multidimensional map; and (f) extracting visually or mathematically any patterns formed within each marked point or between marked points.

As previously stated, there is no disclosure or motivation within the references to combine the teachings of *Young* and *Rothberg*. The examiner cites *Rothberg* (col. 16, lines 4-14), but, again, there is no motivation to combine *Young*, which teaches the ordering of colors. Nowhere in lines 4-14 is there the suggestion that a method of ordering colors and a method of identifying DNA sequences without sequencing can be combined. *Rothberg* precisely teaches nucleotide sequences (*Rothberg*: col. 16, line 9) and subsequences (*Rothberg*: col. 16, lines 5, 6, and 11). The Examiner suggests that “a new pattern that optimizes the information measure” supplies motivation (*Rothberg*: col. 16, line 14). Applicant respectfully disagrees. The pattern in the cited line denotes an arrangement of a nucleotide sequence to better recognize another nucleotide sequence through a biological assay, in no way alluding to a complex plane or ordered fractal geometry.

Moreover, even if there were a motivation, the combination would not render the present technology. Rothberg does not teach the comparison string as the Examiner suggests (“*Rothberg* teaches a dataset”). Neither of *Rothberg*’s “datasets” are mathematically generated. Additionally, neither reference teaches that the point alone, chosen from a multidimensional map, is sufficient to represent the comparison string, which itself is a model of the target string. Therefore, the point is a model of the target string. Moreover, neither reference discloses extracting patterns from the points alone. Thus, the combination of the two references—even if there were a motivation to combine—does not forestall the patentability of the present invention. Accordingly, Applicant respectfully submits that the amended Claim 65 is in condition of allowance and respectfully requests early notice of the same.

Amended Claim 66 requires (a) a multidimensional map comprising points which can serve as domains for an iterative algorithm to generate datasets of data, and each point can be represented by coordinates on the map; (b) means for mathematically generating from the points in the multidimensional map comparison strings comprising datasets of data, each comparison string comprising a dataset of data and each of the points can serve as a domain for an iterative algorithm to generate a dataset of data; (c) a means for scoring the comparison string to determine if the comparison string meets a pre-determined condition or property related to the target string; (d) means for marking the points in the multidimensional map if the score of the comparison string meets the pre-determined condition or property; (e) means for extracting visually or mathematically any patterns formed within each point or between points. Amended Claim 66 details a system rather than a method and is allowable based on the same argument described above for amended Claim 31.

Claims 67-96 are dependent claims based on amended Claim 66. Since amended Claim 66 is allowable, as previously detailed, narrower claims 67-74 and 76-96 are, thus, allowable also. Likewise, new Claims 101-104 are dependent upon Claim 66, and are, therefore, allowable.

Claim 75 is cancelled.

III. Young, in view of both *Rothberg* and *Rigault*, does not render the claims obvious

The Examiner has rejected Claims 53, 54, and 88 as being unpatentable over *Young*, in light of *Rothberg* and *Rigault*. (OA 5) Applicant respectfully traverses this rejection. Claims 53

and 54 are dependent claims based on amended independent Claim 31. Since amended Claim 31 is allowable, as previously detailed, narrower Claims 53 and 54 are, consequently, also allowable. Claim 88 is a dependent claim based on amended independent Claim 66. Since amended Claim 66 is allowable, as previously detailed, narrower Claim 88 is, thus, allowable also.


IV. *Young*, in view of both *Rothberg* and *Agrafiotis*, does not render the claims obvious

The Examiner has rejected claims 55-58 and 89-92 as being unpatentable over *Young*, in light of *Rothberg* and *Agrafiotis*. Applicant respectfully traverses this rejection. Claims 55-58 are dependent claims based on amended independent Claim 31. Since amended Claim 31 is allowable, as previously detailed, narrower claims 55-58 are, consequently, also allowable. Claims 89-92 are dependent claims based on amended independent Claim 66. Since amended Claim 66 is allowable, as previously detailed, narrower Claims 89-92 are, thus, allowable also.

In view of the foregoing Amendments and Remarks, Applicant respectfully submits that Claims 31-63 and 65-96 are in condition for allowance and respectfully requests early notice of the same.

Respectfully submitted,
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